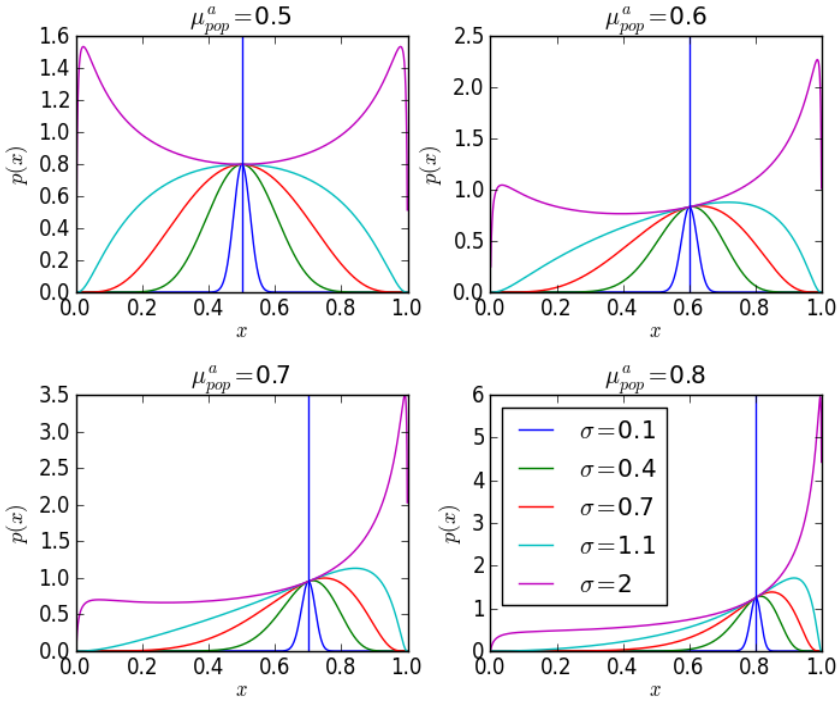

Figure 1: prior predictive distribution of $\tilde{\mu}^a$ for several values of μ^a_{pop}

1. Changed model slightly. Now, model the inverse of the rate parameter, because it is more interpretable.
2. We are using generalized linear models for each of the 3 parameters. For each parameter, the dispersion parameter is shared across patients.
3. Concerned about our prior knowledge on $\tilde{\mu}^a$, because this is our belief about the expected value of $\tilde{a}$.
4. Key quantity of interest is $\tilde{\sigma}^a = c^a \sum_{j=1}^{k} \tilde{x}_j^2$
5. For a test datapoint $\tilde{x}$, prior predictive distribution of $\tilde{\mu}^a$ is unimodal if $\tilde{\sigma}^a < 1$. So would like $\tilde{\sigma}^a$ to be less than 1 most of the time. See Figure 1.
6. Likewise, want prior predictive distribution of $\tilde{\mu}^a$ to be unimodal. See Figure 2. This is always the case. So might only worry about how the mode changes as $\tilde{\mu}^a$ changes. See Figure 3. Looks like if we keep $\tilde{\sigma}^c$ below 1, that would be fine.
7. Now, interested in $\tilde{a}$ - the result of the random effect deviation from the conditional mean $\tilde{\mu}^a$. See Figure 4. If λ^a is too big, the distribution of $\tilde{a}$ is no longer unimodal. Seems like if λ^a is greater than 10, we are fine.
8. Likewise, interested in $\tilde{c}$ - the result of the random effect deviation from the conditional mean $\tilde{\mu}^c$. See Figure 5. $\lambda^c = 1$ seems fine.
9. Finally, drew prior over curves, for different values of $\tilde{\sigma}^a = \tilde{\sigma}^b = \tilde{\sigma}^c$. (they're not necessarily equal). See Figure 6.

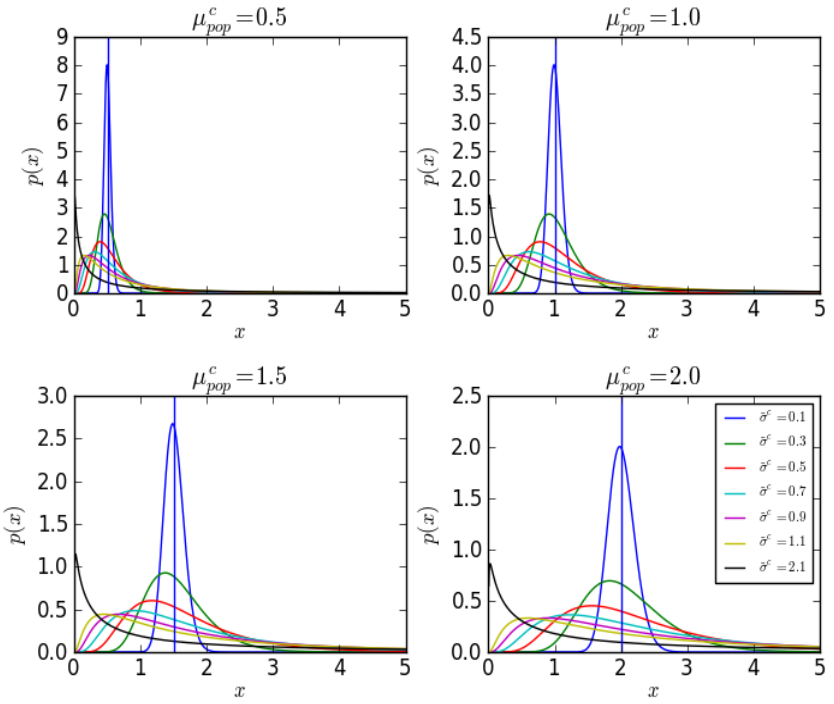

Figure 2: prior predictive distribution of $\tilde{\mu}^c$ for several values of μ^c_{pop}

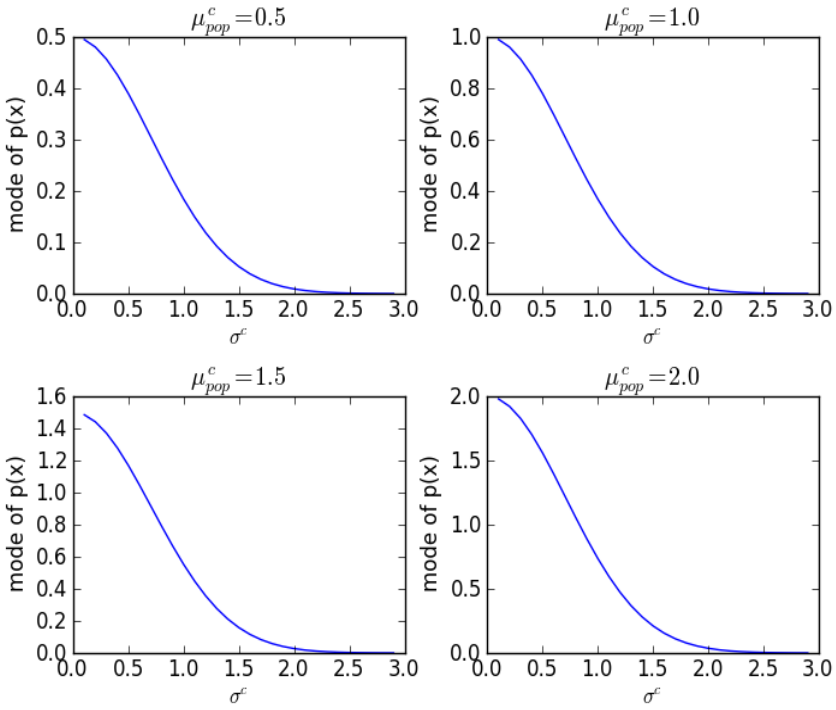

Figure 3: Dependence of mode of $\tilde{\mu}^c$ on $\tilde{\sigma}^c$for several values of μ^c_{pop}

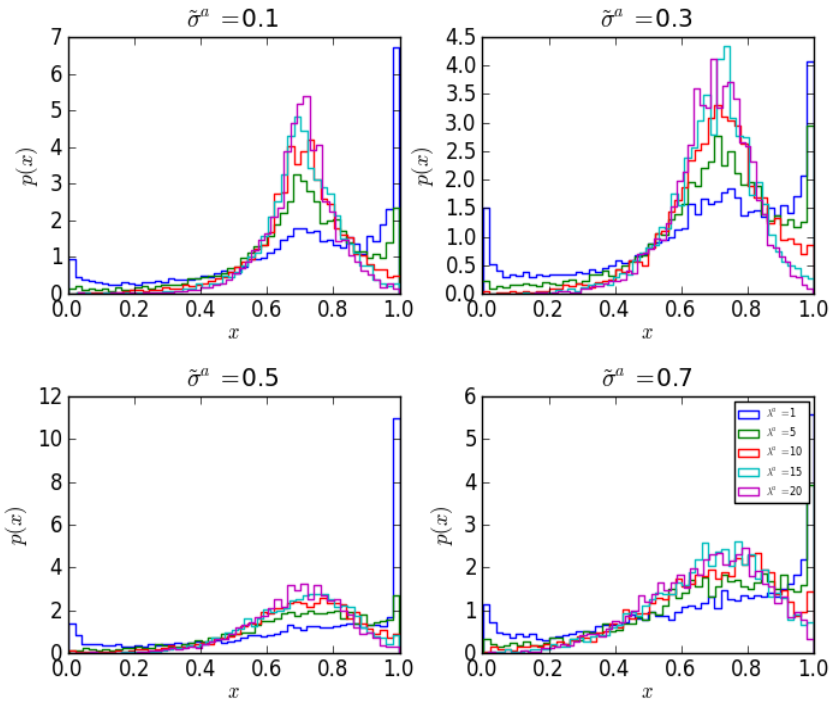

Figure 4: prior predictive distribution of $\tilde{a}$ for several values of $\tilde{\sigma}^a$ and λ^a

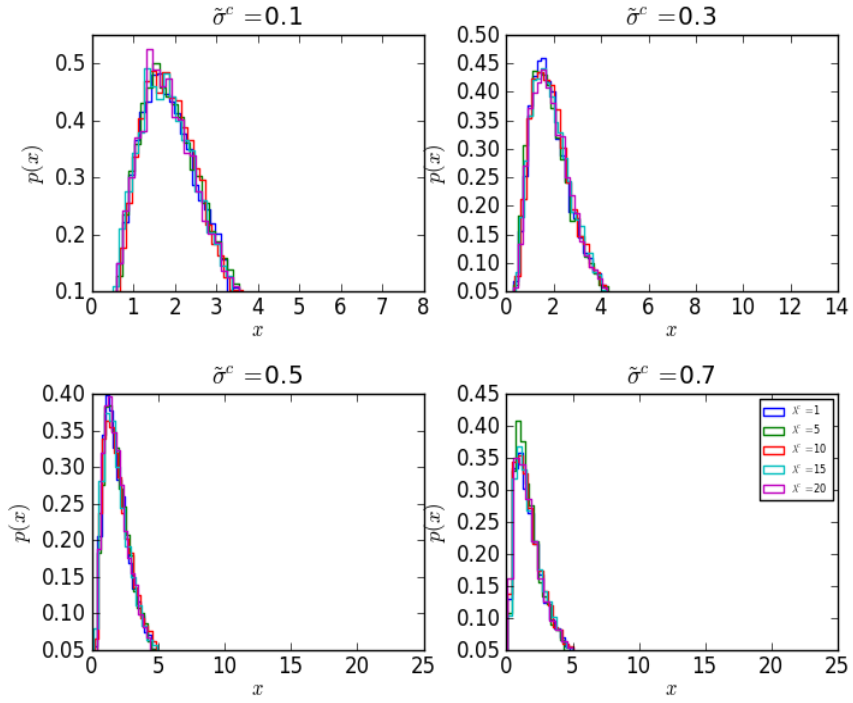

Figure 5: prior predictive distribution of $\tilde{c}$ for several values of $\tilde{\sigma}^c$ and λ^c

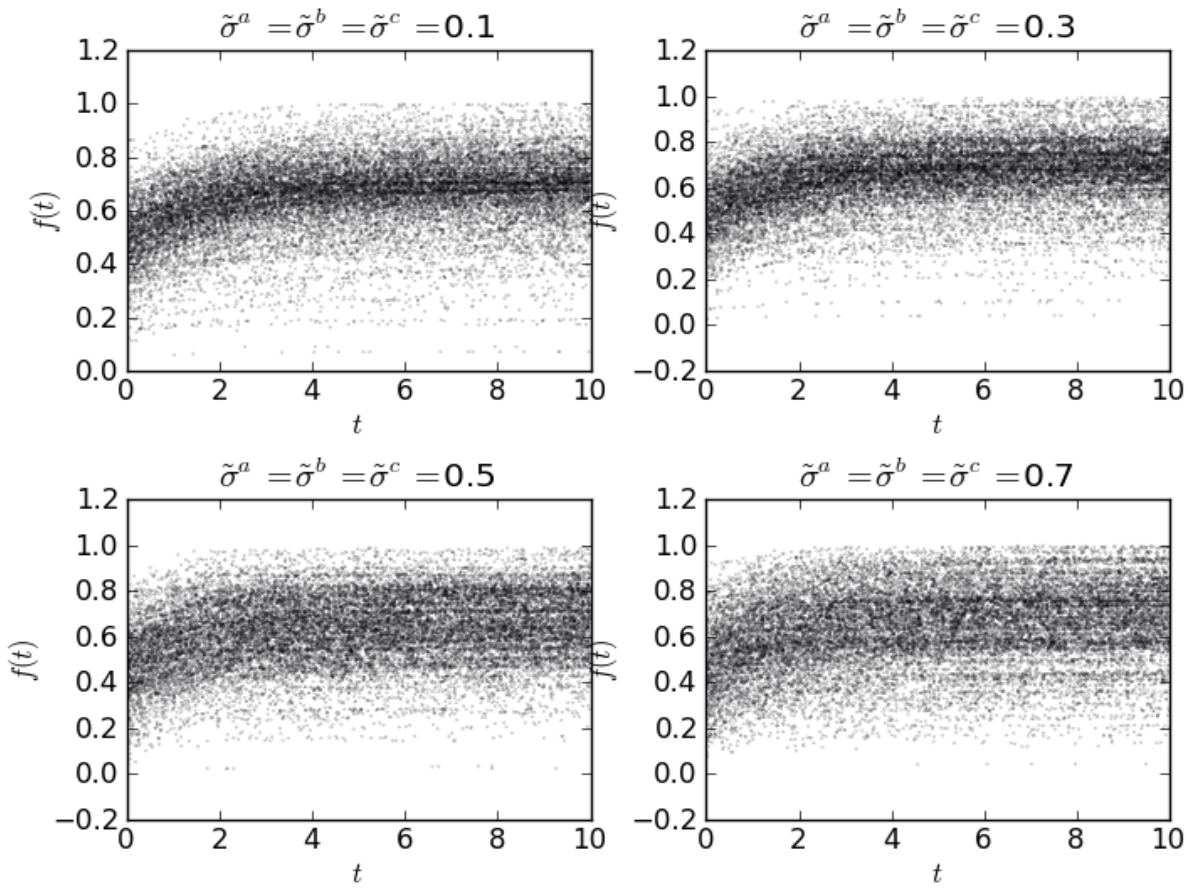

Figure 6: Curve prior for several different values of $\tilde{\sigma}^a = \tilde{\sigma}^b = \tilde{\sigma}^c$